





Product group:	limit switch box flex	Product type:	EFX...-K3	neptūn	EN
Certifications:	 				



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Thank you for choosing a EUROTEC product. In doing so, you have chosen a quality product. To ensure functionality and your own safety, please read these operating instructions carefully before beginning with the installation. Nevertheless, should you have any further questions, please contact:

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

### 1. Device Description

Limit switch boxes serve to provide feedback and control the position of industrial valves, which are activated using pneumatic actuators. The shaft of the limit switch box has a positive connection with the shaft of the actuator and is rotated with the rotational movement of the actuator. The actuating cams attached to the shaft, activate the installed sensors, which support the electronic signal transmission.

The flex K3 limit switch boxes of type EFX are, depending on the model, equipped with 1 to 4 proximity switches. Which contain 1-4 V3 proximity switches, 1-3 slot type sensors, 1-2 cylindrical sensors, 1 dual sensor. The dust ignition protection comes from the switch box housing.

### 2. Intended use

The flex K3 limit switch boxes from the EUROTEC Antriebszubehör GmbH are intended for use in the explosive area of zone 2 with gases, mists or vapours and zone 22 with combustible dust.

ATEX / IECEx	
	II 3G Ex ec IIC T5-T6 Gc
	II 3D Ex tc IIIC T80°C-T95°C Dc

Its approved for use in the following ambient temperature ranges:

T6/T80°C: -55°C/-25°C...+40°C

T5/T95°C: -55°C/-25°C...+60°C

The approved ambient temperature varies, depending on the sealing compound and the installed switch type. You can find the ambient temperature in the corresponding data sheet and on the product label. A lower temperature range down to -55°C applies to limit switch boxes, which are made of components, that are at least suitable for this temperature.

Nominal voltage:  $U_{max} = 60V$  AC/DC  
Max. power dissipation:  $P_{max} = 2,5W$

A further shaft feed-through in the cover may additionally be provided, which is constructed structurally the same. This makes it possible to create an additional interface according to VDI/VDE 3845, which enables the assembly of further components on top of the cover (-WD).

### 3. Labeling

The labeling on the housing is shown in Fig. 1 and varies depending on the installed switch type. You can find the serial number below the CE mark. It consists of the year of manufacture and the respective order number.

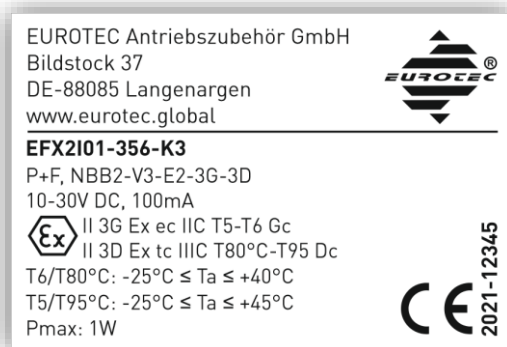


Fig. 1: Labeling



**The housings are not intended to be used as stepladders, to climb into the system. This can lead to damaging them and having a negative effect on their function. If the housing is damaged, water as well as dirt and combustible material can accumulate inside the housing. This can lead to a short circuit. Furthermore, the device can heat up severely due to the accumulation and can cause an explosion.**

#### 4. Safe activation

To avoid mistakes, only specialists are permitted to set up, connect and put the devices into operation. The specialists must have expertise in the protection by flameproof enclosures Ex ec, and Ex t as well as in all relevant regulations and provisions for operating materials in explosive areas. The limit switch boxes are developed in compliance with the following harmonized standards:

EN 60079-0:2018

EN 60079-7:2015

EN 60079-31:2014

It is imperative to observe the following safety instructions prior to initial operation:



**Failure to observe the safety instructions in these operating instructions and using or handling the device improperly, releases us from any liability. Furthermore, the warranty for the devices and accessory components will expire.**

- ☞ Check on the labeling, whether or not the existing device is suitable for your case of application.
- ☞ Observe national regulations and provisions as well as the corresponding installation specifications.
- ☞ Take suitable measures, to prevent unintentional activation or improper interferences with the device.
- ☞ Remove any existing sealing plugs just before inserting the wires to avoid Dirt in the housing.
- ☞ Make sure the strain is sufficiently relieved on the connecting cables or lay them securely.
- ☞ Check the approved conductor cross-sections as well as the approved tightening torques in the documentation for Cable connections
- ☞ Effectively protect the devices and cables against damages.
- ☞ Avoid static charge on plastic parts and cables.
- ☞ Housing components made of metal must be included in the potential equalisation by means of appropriate assembly.
- ☞ This device may only be operated in a fully assembled condition.
- ☞ Never disconnect the connector cables while they have power.

#### 5. Assembly on actuators

Using the enclosed mounting material, the modules can be quickly and easily assembled to the provided actuator according to VDI/VDE 3845 [Association of German Engineers/German Electrical Engineering Association].

1. Adjust your actuator to the final position, in which the groove of the drive shaft is parallel to the drive housing.
2. Now, place the box with the appropriate mounting bracket on the actuator.
3. The mounting bracket can now be screwed tightly onto the actuator using the provided lock screws (4 pcs.).
4. Unscrew the four cover screws and open the housing. Make sure you do not unscrew the screws too far; they should remain in the cover.
5. Insert the system cable into the housing through the cable gland and connect the individual wires to the terminal block. When doing so, please refer to the terminal diagram on the respective data sheet or on the cover of the housing and connect the housing to the equipotential bonding.
6. Close the housing using the cover. When attaching the cover, please make sure that the seal is correctly positioned and tighten the cover screws.

#### 6. Assembly on manual valves

The limit switch boxes with F05 interface at the bottom side of the housing can also be mounted on manual valves by using our mounting kit "MSH". Thereto your manual valve needs a top flange according to ISO 5211 (F03 - F16) and a threaded bore hole in the valve shaft. For detailed assembly instructions please consider the operation manual of the "MSH".

#### 7. Electrical Connection

You can find the approved cable diameter in the corresponding data sheet for the limit switch box. You can find the terminal diagram for the wiring either on or in the cover of the housing as well as on the corresponding data sheet for the limit switch box.



**When tightening the cable gland, please make sure that the base body of the cable gland, which is screwed in place in the housing, does not rotate as well. This could make the sealing washer shift and it would then no longer provide proper sealing. It is best to use 2 open-ended spanners for this purpose. One to secure the base body of the cable gland and one to tighten the screw nut.**

Standard terminals:

Terminal	Producer	Certificate	Wire cross-section	Multi conductor	Tightening torque	Stripping length	Colour
MSB 2,5-RZK	Phoenix	PTB 08 ATEX 1075U	0,5 - 2,5mm <sup>2</sup>	none	spring-cage	8 mm	grey
2703208...	Phoenix	PTB 06 ATEX 1034U	0,5 - 2,5 mm <sup>2</sup>	2x1,50 mm <sup>2</sup>	0,6 - 0,8 Nm	8 mm	grey

Standard cable glands:

Cable gland	Manufacturer	Certificate	Size	Cable diameter	Material	Colour
ESKE...	WISKA	PTB 13 ATEX 1015 X	M20x1,5 red.	4 - 13 mm	PA6	black
ESKE...	WISKA	PTB 13 ATEX 1015 X	M20x1,5	7 - 13 mm	PA6	black
GHG...	CEAG	PTB 99 ATEX 3128 X	M25x1,5	8,0 - 17 mm	PA6	black

If you have installed another Ex e terminal in the housing, then please find the connection data in the corresponding data sheet and the corresponding type examination certificate for the cable gland.

### 8. Disassembly

During dismantling you must observe the instructions in Chapter 4.

1. Disconnect the device from the power supply.
2. Open the cover of the housing by unscrewing the 4 cover screws. Make sure that you do not unscrew the screws too far; they should remain in the cover and not be able to fall out.
3. Disconnect the cables in the system from the terminal strip in the limit switch box.
4. Now, unscrew the 4 screws with which the bracket of the box is attached to the actuator and remove the limit switch box from the actuator.

### 9. Adjusting the swivel range

In delivered status the cams are always preset on a swivel range of 0 - 90°. If you need another swivel range, please proceed with the following steps:

#### 1. Rectangular V3 limit switches

- a. Bring the actuator in the desired end position 1. Adjust the lower cam first. Press the cam down and turn it into the position in which it actuates the switch. Now let the cam engage again with the toothing. (Fig.2+3)
- b. Bring the actuator in the desired end position 2. Press the upper cam down and turn it into the position in which it actuates the switch. Now let the cam engage again with the toothing.
- c. Finally verify your presetting through repeated switching.



Fig. 2: Cam setting

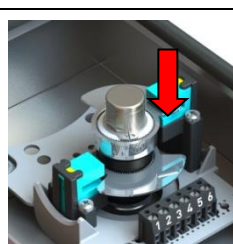



Fig. 3: Slot type cams

#### 2. Cylindrical limit switches

- d. Loosen the M6 nut screw and remove the upper cam. (Fig.45)
- e. Unfasten the threaded rod, bring the actuator in the desired end position 1, and adjust the lower cam. Then tighten the threaded rod again firmly. (Fig. 5)
- f. Bring the actuator in the desired end position 2, adjust the upper cam and tighten it again by means of the nut screw. (Fig. 6)
- g. Finally verify your presetting through repeated switching of the actuator.

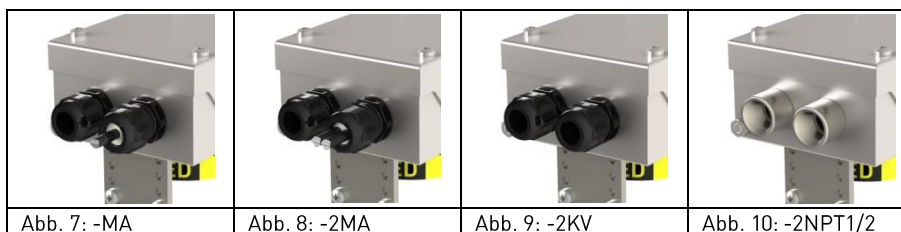


Fig. 4: Loosen nut screw	Fig. 5: Fixation of cam 1	Fig. 6: Fixation of cam 2
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	<p><b>Danger of injury. During the switching process of the actuator you might squeeze body parts between switch and cam. Stay far enough away from the source of danger when switching the actuator. Attention, the switch can be damaged by the cams in the event of a wrong presetting. Take care that the cam does not hit the switch when switching the actuator.</b></p>
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## 10. Connecting magnetic coils

Depending on the model, the flex K3 limit switch boxes of EUROTEC provide the possibility to connect one or two solenoid coils Ex ec, Ex m, Ex dm or Ex d inside the housing. The suitable switch boxes for one coil are marked with an additional '-MA' in their part number. This version has a cable with a length of 500mm that is connected to the terminal block inside the housing and lead outside the housing through a cable gland. The leads of this cable have to be wired to the plug connector of the solenoid coil. Please consider the coil manufacturer's operation manual and the circuit diagram on or inside the limit switch box cover or on the according technical data sheet. The same applies to the connection of two solenoid coils. This version is marked with an additional '-2MA' in its part number and provides two cables with a length of 500mm each. With the models "-2KV" and "-2NPT1/2" the solenoid valve connection Ex ec, Ex m, Ex dm or Ex d is optional on poles 7-9.



## 11. Outdoor use

If you would like to use the limit switch boxes outdoors (outdoor installation), the limit switch boxes should be equipped with an Ex e pressure compensating element. The pressure compensating element prevents water condensation in the housing in the event of outdoor temperature fluctuations. Please check whether or not there is a pressure compensating element. If not, you have to order respective limit switch boxes. In this case, the addition to the item number is "-DAE".

## 12. Maintenance

The limit switch boxes for ATEX areas may never be opened during operation or in an existing explosive atmosphere. Opening them can cause an explosion. Therefore, maintenance work is only possible outside of the Ex area. The cover screws can loosen in the event of strong vibrations or temperature fluctuations. Retighten the screws every two years. Any other modifications to the device are prohibited!

## 13. Malfunctions

In the event of malfunctions, please check the lines, line connectors and the position of the cams. Furthermore, please check whether condensation has accumulated in the housing and whether the valve and the actuator are functioning properly. Rectify any possible errors. If this does not rectify the malfunction, disconnect the housing from the power supply voltage and contact one of the manufacturer's authorised and trained specialists.

## 14. Item number

Please refer to the related order code of the switch box series flex EFX-K3.

## 15. EU Declaration of Conformity

### EU-Declaration of Conformity according to the Directive 2014/34/EU (ATEX-Directive)



We herewith confirm that the following named equipment for the use in hazardous areas does fulfill the requirements of the Directive 2014/34/EU in the delivered execution:

EFX...K3... flex limit switch box. Housing stainless steel

The equipment has been developed and designed in consideration of the following harmonised standards:

EN 60079-0:2018	Explosive atmospheres - Part 0: Equipment - General requirements
EN 60079-7:2015 + A1:2017	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
EN 60079-31:2014	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

#### Marking:

 II 3G Ex ec IIC T5-T6 Gd  
 II 3D Ex tc IIIC T80°C-T95°C Dc

2021-11-05  
Date

  
General Manager Melissa Berge